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EARNINGS IN SHIPBUILDING

The earnings structure of the engineering industry has recently been examined by us in some detail.[1] That of the shipbuilding (and ship-repairing) industry is in many ways similar: in both there are a certain number of major trades distinguished by recognised apprenticeships; both have a long history and are, in origin, heavy capital goods industries; both tend to be concentrated in large centres fairly widely dispersed geographically. Despite the introduction of new methods, shipbuilding remains essentially a craftsman's industry with a tradition of apprenticeship, and produces heavy capital goods only (we exclude boat- and yacht-building); it is located principally in a few large centres; and there is now extensive piecework and payment by results in the industry. Ship-repairing tends to be concentrated in the big ports, not necessarily in the shipbuilding areas; its habits of work are probably rather less regular than those of shipbuilding, but it has been subject to a less violent cyclical fluctuation in employment.[2] It is customarily grouped with shipbuilding for organisational and statistical purposes, since many shipbuilders are also ship-repairers or undertake occasional repair jobs. Thus, except where it is otherwise stated, we use the term 'shipbuilding' to cover repairing as well as building.

1. *The timeworker*

The rates structure of the industry for timeworkers is, on the surface at least, straightforward. Since 1929 there have been National Uniform Plain Time Rates for skilled and for unskilled workers; these rates, after a reduction in 1931, were increased by several bonuses between then and 1939, and by war bonuses afterwards. The latest agreement (Nov. 13th, 1950) consolidated all these bonuses and granted increases in rates, so that there is now one inclusive national uniform new work plain time rate for fully skilled classes (120 shillings per week), and one for unskilled classes (100 shillings per week).

These rates refer to new work only, and there is a standard 3-shilling addition for those engaged on repair work. The rates apply to all areas except to the Thames repairing district, where the rates exceed the national rates by 10 shillings, and to the Bristol Channel repairing district, where there are also certain higher rates. The position of semi-skilled workers is less clear: some of them (*e.g.* cranemen, blacksmiths' strikers, redleaders, and stagers) have national rates, but others have not. The scheme of 1929 was designed to eliminate shipyard-to-shipyard differences in rates paid to timeworkers, but it did not preclude special payments for exceptional work, nor did it create uniformity in timeworkers' earnings.

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[1] See BULLETIN, June and July, 1951. Data for the present article have been somewhat more restricted.

[2] Cf. *Industrial Survey of the North East Coast Area*, H.M.S.O., 1932, p. 244; and W. Smith, *Distribution of Population and Location of Industry on Merseyside*, 1942, pp. 61–64.

Table I illustrates the differences between the wages of skilled and unskilled adult male timeworkers, in terms of rates and of earnings. The skill differential based on rates narrows steadily from 1940; that based on earnings fluctuates, and appears, until recently, to have been the narrower. Thus rates have not adequately reflected relative earnings strength. Earnings are, as in engineering, well above rates, but rates in the post-war period have tended to draw closer. Therefore, although rates have become a somewhat more reliable guide to the level of earnings, they are less reliable as an indicator of changes in earnings. (Earnings fell in 1946 for the classes mentioned, while rates rose.) Much of the explanation of these tendencies is of course to be found in the fluctuations, in relation to the work in hand, of the hours actually worked in the industry (Table IV).

TABLE I

Weekly Rates and Average Weekly Earnings of Skilled and Unskilled Timeworkers

Year and Month	*Weekly rates* (shillings)*			*Average weekly earnings (nearest shilling)*		
	skilled	unskilled	unskilled as % of skilled	skilled	unskilled	unskilled as % of skilled
1906	N.A.	N.A.	*(50–55)*	35	21	*60*
1940 June ...	75.0	56.0	*74.7*	105	82	*78*
1941 September	78.5	59.5	*75.8*	114	91	*80*
1942 October	83.5	64.5	*77.2*	128	102	*80*
1943 November	89.5	70.5	*78.7*	135	109	*81*
1944 November	93.5	74.5	*79.6*	136	115	*85*
1946 January ...	98.0	79.0	*80.6*	117	98	*84*
1948 April ...	104.0	85.0	*81.8*	137	112	*82*
1950 January ...	109.0	92.0	*84.4*	146	117	*80*

* The figures for 1940–1945 have been compiled in the light of recent information, and they consequently differ slightly from those given in a previous article (*Differences between the Wages of Skilled and Unskilled Workers, 1880–1950*, BULLETIN, April 1951). The unskilled wage rate for end 1950 was there given in error as 98.0 shillings; this should have read 100.0, and the 1950 skill differential in rates should have read 83.4 per cent instead of 81.7.

Source: *Handbook of National Agreements*, 1949; *Earnings Enquiry*, 1906; data quoted by Shipbuilding Employers' Federation to Unions at wage negotiations.

Again, earnings exceeded rates in 1940 by 40 per cent for the skilled, and by 46 per cent for the unskilled. This was clearly in part, but by no means wholly, due to overtime. In the post-war period, when there was much less overtime, earnings were still substantially above rates—which reflects the practice of making special payments to timeworkers, above their national rate, for work in confined spaces, oilship repair work, and so on.

2. *The pieceworker*[1]

There are probably fewer different systems of payment by results in shipbuilding than in engineering. There are a number of traditionally pieceworking trades, and workers in these trades still work to piecework price lists. There has been a tradition, too, of close association between the craftsman and his helpers in such trades. Practice has varied, but the helper was often on a time rate while the craftsman was on piecework. The helper will now more frequently share, in some proportion, in the P. by R. earnings of the craftsman. There has also been an increasing tendency for a squad of craftsmen to contract to do a job for a fixed price or for payment related to fixed hours—dividing the proceeds between themselves and possibly also with their own assistants and unskilled labour. Such practices have extended beyond the traditionally pieceworking groups to other trades. There is also some ' lieuwork ' in the industry: the intention of a lieuwork rate is that it should be paid to a traditional pieceworker for work at piecework speed, where the job is not suited to the reckoning of a piecework price.[2] The number of lieuworkers is much smaller than the number of pieceworkers, and their earnings are usually slightly lower on the average. Until the latest agreement, there was no ' minimum piecework standard ' or percentage by which piecework earnings were prescribed to exceed time rates, as there is in engineering; now, it is laid down that piecework earnings in a normal week are to exceed time rates by at least 17s. 6d. for skilled classes and 15s. for unskilled. Table II suggests that this minimum is likely to be fairly generally exceeded.

TABLE II

Pieceworkers' Average Weekly Earnings and Relative Numbers

Year and month	*Skilled*			*Unskilled*		
	piece-workers' earnings (nearest shilling)	as % of time-workers' earnings	number of piece-workers as % of total skilled	piece-workers' earnings (nearest shilling)	as % of time-workers' earnings	number of piece-workers as % of total unskilled
1906	50	*145*	*35*	28	*133*	*4*
1940 June ...	139	*132*	N.A.	N.A.	N.A.	N.A.
1941 September	149	*131*	N.A.	N.A.	N.A.	N.A.
1942 October ...	165	*129*	N.A.	N.A.	N.A.	N.A.
1943 November	170	*126*	N.A.	N.A.	N.A.	N.A.
1944 November	159	*117*	N.A.	N.A.	N.A.	N.A.
1946 January ...	147	*125*	N.A.	N.A.	N.A.	N.A.
1948 April ...	169	*123*	N.A.	149	*133*	N.A.
1950 January ...	175	*120*	*83**	155	*132*	*33**

* Private sources.

Main source : *Earnings Enquiry*, 1906 ; data quoted by Shipbuilding Employers' Federation to Unions at wage negotiations.

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[1] Except where a special distinction is made, the term ' pieceworker ', in both text and tables, includes workers on various other forms of payment by results as well as pieceworkers in the strict sense.

[2] In engineering, ' lieu rates ' generally mean rates paid to timeworkers to bring their earnings closer to those of P. by R. workers. ' Lieu ' therefore has a different bearing here.

Over 80 per cent of the skilled workers in shipbuilding are now on piecework or on some form of payment by results or incentive payment; and on the average these workers are able to earn 20 per cent more than the skilled timeworkers (Table II). Both these proportions are higher than in engineering.

While there has been a marked growth in the number of pieceworkers in the skilled grades, there has also been a marked fall in the extent to which the earnings of skilled pieceworkers have exceeded those of skilled timeworkers. Table II shows a general decline in this latter proportion during and since the war: because equal flat-rate increases were granted to both timeworkers and pieceworkers, timeworkers have gained relatively. There has not been a constant growth in the relative hours of skilled timeworkers (Table IV), although timeworkers did work long hours during the war. The number of unskilled pieceworkers has also grown, though to a lesser relative extent, while their relative earnings have not declined as much as those of the skilled. Semi-skilled work in shipbuilding, unlike that in engineering, is not entirely related to the increased use of machines, nor is it in general a particularly new development. The semi-skilled category consists rather of tradesmen's assistants such as strikers, or of workers in certain specific less skilled occupations such as the redleaders. Accordingly there has not been as strong a tendency for their wages to overtake those of the skilled; in general and on the average their weekly earnings lie between those of skilled and unskilled workers—occasionally falling below those of the unskilled. In contrast to engineering, too, there are now relatively fewer pieceworkers amongst the semi-skilled than amongst the skilled.

Table III shows the earnings of adult male pieceworkers in various occupations—all, except the last three, skilled occupations—in relation to those of shipwrights.

The spread in the average earnings of pieceworkers in different skilled occupations has narrowed over time, but is still large. The earnings of workers in the semi-skilled and unskilled occupations have of course drawn closer to those of the skilled. Amongst the occupations themselves, the biggest relative decline has been that of the platers (and the anglesmiths), while the newer trade of welders has gained in relative earning power. Painters' earnings have, over the years, and with the development of P. by R. systems within the trade, come nearer to those of other skilled classes. While, in general, the earnings of the semi-skilled have not overtaken those of the skilled, the weekly earnings of some semi-skilled pieceworkers (and of the relatively small number of labourers who are paid by results) have come up to those of the skilled trade of joiners. (This may partly be affected by relative hours.) The relative standing of the various occupations differs from region to region, as does also the spread of occupational earnings.

Table IV shows the hours worked by skilled and unskilled pieceworkers (and timeworkers) since 1940. There were very long working hours during the war period. As in engineering, the pieceworkers worked shorter hours

TABLE III

Relative Earnings in Various Occupations (Pieceworkers Only)

Occupation	*Occupational average weekly earnings as percentage of shipwrights'*		
	1906	1936	1950
Shipwrights	*100*	*100*	*100*
Platers	140.5	120.5	120
Anglesmiths	138.5	122	—
Blacksmiths	112	105	109
Caulkers	110	97.5	116
Riveters	104	96	116
Joiners	99	N.A.	93.5
Drillers	85.5	91.5	117
Painters	69	N.A.	103.5
Plumbers	N.A.	N.A.	102
Welders	—	102	123
Electricians	—	N.A.	107.5
Blacksmiths' strikers ...	65	N.A.	84
Redleaders	62.5	N.A.	93.5
Labourers	61	N.A.	96.5

Source: *Earnings Enquiry*, 1906; private sources.

on the average than did the timeworkers, and the skilled shorter hours than the unskilled. Normal hours were reduced from 47 to 44 in February 1947, so that, except for skilled workers in 1946, there appears to have been little short time—and there was still some overtime in the post-war period.

TABLE IV

Hours Worked by Different Categories of Workers

Year and month	*Skilled*		*Unskilled*	
	piece-workers	time-workers	piece-workers	time-workers
1940 June	50	55½	N.A.	57
1941 September ...	50	56	N.A.	58
1942 October ...	51	57	N.A.	58
1943 November ...	49	55	N.A.	57
1944 November ...	47	53	N.A.	55
1946 January	44	47	N.A.	48
1948 April	46	47½	48	49½
1950 January ...	46	47	47½	48

Source: data quoted by Shipbuilding Employers' Federation to Unions at wage negotiations.

3. *Workers in different regions*

Evidence on regional earnings levels in shipbuilding is inadequate, but some data are available from the *Earnings Enquiry* for 1906, and from private sources for January 1950. These are compared in Table V. Only rough comparability, of course, can be achieved.

There were greater differences between the average weekly pay-packets of workers in different areas of the country in 1950 than in 1906. In addition, the regional earnings pattern has changed greatly in the interval. The South

TABLE V

Earnings by Area, 1906 and 1950

Area		*Average weekly earnings*		*Proportion of piece-workers*	*Average hours*
	number of workers (000)	all workers (shillings)	piece-workers' earnings as % of time-workers'	% of all workers	all workers
1906					
1. Tyne, Wear, Tees	29	33.1	*139*	*50*	N.A.
2. Scotland ...	27	32.6	*132*	*36*	N.A.
3. Rest of U.K. ...	9	32.1	*146*	*29*	N.A.
4. Mersey & Barrow	6	32.0	*136*	*17*	N.A.
5. South of England	14	31.2	*120*	*15*	N.A.
1950					
1. South of England	22	180	*123*	*43*	50
2. Tyne, Wear, Tees	31	151	*124*	*48*	46
3. Scotland ...	30	145	*140*	*57*	46
4. Mersey & Barrow	8	144	*125*	*72*	45
5. Rest of U.K. ...	14	139	*133*	*56*	45
1950 (areas divided according to predominant character of work undertaken)					
1. South of England (repair) ...	20	183	*122*	*44*	51
2. Mersey & Barrow (repair)* ...	(1)	(164)	(*132*)	(*55*)	(49)
3. Tyne, Wear, Tees (repair) ...	10	158	*125*	*34*	48
4. South of England (new)	1	149	*117*	*24*	47
5. Tyne, Wear, Tees (new)	21	147	*126*	*55*	46
6. Scotland (new) ...	30	145	*140*	*57*	46
7. Mersey & Barrow (new)	8	143	*125*	*73*	45
8. Rest of U.K. (new)	14	139	*133*	*56*	45

* In 1950, almost but not quite all the relevant sections of workers are covered—the most notable exception being most ship-repairers on the Mersey. With the addition of these workers, workers in H.M. dockyards, boatbuilders, and clerical workers, the total number of workers covered above appears to agree quite well with the figures of total employment in the industry as given by the Ministry of Labour.

Source: 1906, *Earnings Enquiry*. 1950, private sources.

of England, from being the lowest in 1936, is now the highest earnings area. Such a change in the order of areas was not found in engineering; although—in so far as widely-separated coastal areas can be said to build up into a regional pattern—the present order of areas in respect of shipbuilding earnings corresponds very generally with that of engineering earnings.[1]

The third section of the table (where an attempt has been made to separate the areas into those predominantly associated with new and with repair work) shows that in 1950 at least there was a clear division between the earnings of ship-repairers and those of shipbuilders—the former being the higher.[1] In 1906, while it is not possible to separate building and repairing sections, the main shipbuilding regions were certainly on the North East Coast and in Scotland, and these areas showed the highest earnings; so that it seems possible that since 1906 the relation between building and repairing earnings has also altered. 1906 was a good year for shipbuilding, despite some labour trouble; but economic conditions between the wars must often have led owners to preserve old ships rather than to build new, and in this period employment fluctuations in ship-repairing were less violent than in shipbuilding. There are, of course, as we have mentioned, additional recognised rates for ship-repairers. Moreover, repair work entails rather more unusual jobs for which special payments are called for. The best known of these is the oilship repair allowance (the subject of a special section of the latest national agreement), but there are undoubtedly others paid from time to time and fixed locally—such as the differential payments for work involving especially dirty, dangerous, or difficult tasks: for example, submarine repair allowances, allowances for repairing ships with dangerous cargoes, allowances for work in double bottoms or in boilers. Ship-repairers have, it is true, been working longer hours than shipbuilders, although the standard week is the same for both. Repair work is in any case likely to involve more overtime on emergency jobs than shipbuilding; and, at least until 1949, the need to adapt ships to new requirements and to carry out normal repairs, as well as to complete war-deferred repairs and to reconvert vessels from their wartime uses, kept ship-repairing at a high level of activity. This difference between ship-repairers' and shipbuilders' earnings, besides having an independent existence of its own, has contributed to the regional differences, since the high earnings areas are also those which undertake a high proportion of ship-repairing. It is important to notice, however, that within both shipbuilding and ship-repairing taken separately the regional pattern is discernible.

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[1] In engineering, earnings in 1948 were highest in the South and Midlands, and decreased outwards and northwards from these areas.

The most obvious of the possible explanations of the differences between the earnings of workers in different areas, and between the earnings of ship-repairers and shipbuilders, lies in their relative hours of work. Hours worked were evidently partly responsible for the differences in earnings in 1950. (Statistics are not available for 1906). The extent to which this was so was roughly tested in the following way.

In order to remove differences in earnings due to differences in hours worked, it is necessary to make some attempt to express earnings in terms of a standard 44-hour week. There are many obvious difficulties in such a procedure, but, while it is not worth quoting figures which cannot be more than rough approximations, the method may be described. By national agreement, the timeworkers have 'an allowance of one half plain time rate (in addition to ordinary earnings)' for each hour of overtime; and the pieceworkers have 'an allowance of 33⅓ per cent. of the average hourly piecework earnings, based upon the hours worked in the pay week in which the overtime occurs (inclusive of the overtime hours).' These special allowances had to be calculated as nearly as possible and deducted for each hour of overtime work. (For timeworkers, this involved computing from the national plain time rates an average rate for each area, allowing for the various proportions of skilled, semi-skilled, and unskilled men.) After the deductions had been made, earnings were expressed in terms of a 44-hour week by a simple proportion.[1]

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[1] The difference in the character of shipbuilding and ship-repairing has been stressed by the I.L.O. : ' wage differentials, both by occupation and by district, have constituted an important barrier to mobility among shipbuilding and ship-repairing workers. In particular, it has been difficult to transfer men from ship-repairing to shipbuilding work, partly because of a difference in wages and partly because the organisation and character of ship-repairing work is preferred by workers accustomed to it. Efforts are being made to eliminate some of the more illogical wage differentials, but this is a long-term task and one which is left largely to the process of collective bargaining ' (*Wartime Transference of Labour* in Great Britain, 1942, p. 84).

Such a test shows that, for timeworkers and pieceworkers separately, the regional patterns are still present in the main, and that differences in hours worked cannot be regarded as a complete explanation of the differences in regional earnings. In particular, the South of England continues to have a clear lead over other areas. Nor do the recognised higher rates paid to ship-repairers[2] suffice to explain their high earnings.

If however the earnings of timeworkers and pieceworkers are taken together, on the basis of a 44-hour week, the regional pattern is largely obscured. While there does not appear to be any clear pattern in the relative earnings of timeworkers and pieceworkers which would explain this, there tends to be a lower proportion of pieceworkers in the high earnings areas and in the ship-repairing sections—and this seems largely to account for the effect.[3]

Thus, even allowing for differences in hours worked and for the recognised special rates for ship-repairers, there are still regional differences in the earnings of timeworkers and of pieceworkers (although differences in the proportion of pieceworkers blur the regional pattern of earnings for a 44-

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[1] The payment for overtime of P. by R. workers, as distinct from pieceworkers proper, is calculated like that of timeworkers. Although, because adequate statistics are lacking, this factor cannot be allowed for, it is not thought likely to contradict the general impression given by the crude test described.

[2] An appropriate deduction to allow for these higher rates was made in the course of the calculations described above. Allowance was made for the additional 10s. in the Thames area, and the 3s. elsewhere; but none could be made for the additional rates recognised as applying in certain cases in the Bristol Channel repairing area, since their exact amount was unknown.

[3] It is worth noting that, while the proportion of pieceworkers (including P. by R. workers generally) has grown in general since 1906, it has not done so with any regularity. In 1906 there were no P. by R. systems other than piecework proper ; these have developed mainly since 1940. Thus the decline, in most areas, in the percentage by which pieceworkers' earnings exceed timeworkers' is no doubt also connected with the extension of P. by R. among workers who had previously been working on time rates. (The alterations since 1906 in the proportion of pieceworkers, and in the relation of their earnings to those of timeworkers, are less marked in Table V than in the corresponding figures of Table II which relate to skilled workers only.)

hour week when timeworkers and pieceworkers are taken together). It may also be remarked in passing that these regional differences are not to be explained by a higher ratio of unskilled in the lower earnings areas. Since therefore differences in earnings do not seem to be completely explainable in these ways, we must conclude that the readiness with which workers are able to obtain, or employers to grant, higher earnings beyond what is nationally agreed varies according to a regional pattern. If we consider solely the amount which the worker is able to take home at the end of the week, then earnings vary considerably and fall into a marked regional pattern not unlike that for engineering.

4. *Conclusions*

(1) As in engineering, there are considerable differences between time rates and timeworkers' earnings, although the divergence between them has narrowed since the war.

(2) In the past, the skill differential based on the earnings of timeworkers has been narrower than that based on rates; but the ' earnings skill differential ' was wider than the ' rates skill differential ' in 1950. Both differentials have narrowed over time.

(3) On the average, the earnings of pieceworkers and P. by R. workers generally are considerably higher than timeworkers' (though on the whole, with the extension of P. by R., this excess has tended to decline), and their hours are shorter than those of timeworkers.

(4) Since the semi-skilled category is more clearly defined in shipbuilding than in engineering (and there are relatively fewer semi-skilled pieceworkers), there has not been so sharp a tendency for the earnings of the semi-skilled to compete with those of the skilled.

(5) Although there is a national uniform rate for skilled workers, there have been considerable changes in the differences between the earnings of workers in the various skilled occupations.

(6) Ship-repairers earn, on the whole, more than shipbuilders.

(7) There is a regional pattern of earnings in the shipbuilding industry. This pattern cannot be accounted for entirely by differences in hours worked, or by different proportions of workers of various categories.

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A 'HUMAN NEEDS' DIET IN NOVEMBER, 1951

In April 1951, the weekly cost of a 'human needs' diet for a family of 5 persons (including three children between 5 and 12 years old) was found to be 54s. 11d.[1] A diet approximately equivalent, from a culinary as well as from a nutritional point of view, could be bought in November for 55s. 7d. This represents a rise in cost of only a little over 3 per cent, which is much less than the rise in the average price of food shown in the Ministry of Labour index of retail prices.[2] In compiling the 'human needs' diet we are not, however, concerned only with prices but also with changes in the conditions of supply, in so far as these can be assumed to affect the pattern of purchases of an intelligent housewife with a small purse. A housewife does not usually cater for her family according to scientific precepts; but any reasonably good housekeeper achieves, by rule of thumb, a diet that provides her family with the essential amounts of calories and proteins, while the cheapest and most important sources of minerals and vitamins have been so widely publicized that they need not be overlooked by her in the planning of the daily menus.

The food rations supply the housewife with a certain basis for the preparation of her meals. Unfortunately it is not a very stable basis, since the size of the rations is not infrequently changed. This calls for adjustments in the dietary. Generally speaking, meat and fish are interchangeable; if both meat and fish are scarce, and milk is freely available, the family, and in particular the children, can eat more milk puddings: such and similar modifications are made by any sensible housewife as a matter of course; and in a family accustomed to well cooked meals, food fads are rare.

The 'human needs' diet set out in Table I could be bought in mid-November 1951, at a total outlay of 55s. 7d., in London,[3] Slough, High Wycombe, Reading, Newbury, Oxford, Thame, Aylesbury, and Banbury, though the prices for some of the items included, varied slightly at different places and on different days. The main changes in the diet schedule—as compared with the schedule for April—resulted from changes in the rations, which, in November, allowed the housewife more meat but less bacon, cheese, and fats. There were also fewer eggs to be had in November, owing to the seasonal reduction in supply. On the other hand herrings—both cured and fresh—were plentiful and fairly cheap. With a good supply of animal protein from meat and fish, the consumption of milk puddings, which was assumed to be rather large in the April schedule, could be reduced. Apples were in season and not expensive, and although they cannot be said to be a nutritionally essential food they are useful for bringing variety into the daily menu; hence one lb. of this 'semi-luxury' seemed to have a rightful place in

[1] T. Schulz, *A 'Human Needs' Diet in April*, 1951, BULLETIN, Vol. 13, No. 6.

[2] From mid-April to mid-September (the date of the latest figure at present available) the Ministry of Labour index of food prices showed a rise of over 6 per cent.

[3] Lambeth and Bethnal Green.

Table I

Weekly 'Human Needs' Diet for a Family of 5 Persons

		Quantity.	Price per Unit[1]		Changes since April 1951 Quantity	*Cost*	
			s.	d.		*s.*	*d.*
(*a*)	Rationed Foods :						
1	Meat	4 lb 8 oz.	1	7[2]	+1 lb 12 oz.	*+2*	*11*
2	Bacon	15 oz.	2	4	— 5 oz.	—	*7½*
3	Margarine	2 lb 3 oz.	1	2	— 5 oz.	+	*5¼*
4	Cooking Fat	10 oz.	1	4	...	+	*2½*
5	Sugar	3 lb 2 oz.		6	...	+	*3*
6	Tea	8 oz.	3	4	...	...	
7	Cheese	7½ oz.	1	2	— 2¼ oz.	—	*2¼*
8	Eggs	5 eggs		4½	— 5 eggs	*—1*	*0½*
	Cost of Group (*a*)		*18*	*3¼*		*+1*	*11½*
(*b*)	Fresh Milk :						
9*a*	Ordinary	18 pt.		5½	— 2 pt.	—	*1*
9*b*	School	5 pt.	free		...	...	
	Cost of Group (*b*)		*8*	*3*		—	*1*
(*c*)	Main Carbohydrate Foods :						
10	Bread	20 lb		3½[3]	...	...	
11	Flour	2 lb		4¾	...	+	*1*
12	Potatoes	21 lb		1¾[4]	...	...	
	Cost of Group (*c*)		*9*	*6*		+	*1*
(*d*)	Fresh Vegetables *excl. potatoes*:						
13*a*	Carrots	3 lb 8 oz.		3½	...	+	*3½*
13*b*	Swedes	3 lb 8 oz.		3½	...	+	*3½*
13*c*	Cabbage	6 lb 8 oz.		3½	...	—	*3¼*
13*d*	Onions...	8 oz.		8	...	+	*2*
	Cost of Group (*d*)		*4*	*3¼*		+	*5¾*
(*e*)	Other Foods :						
14*a*	Peas	12 oz.		11	...	...	
14*b*	Beans	8 oz.		11	...	...	
14*c*	Lentils...	4 oz.	1	2	...	+	*0½*
15	Rolled Oats	2 lb 8 oz.		9	...	+	*2½*
16*a*	Macaroni	1 lb		11	— 4 oz.	—	*2¾*
16*b*	Semolina	1 lb		7½	— 8 oz.	—	*3*
17	Rice	1 lb		10	— 8 oz.	—	*5*
18*a*	Jam	6 oz.	1	3	...	...	
18*b*	Syrup	1 lb		10	...	...	
19	Dried Fruit[5]	8 oz.	1	0	— 8 oz.	—	*6*
20	Cocoa	4 oz.	1	7½	...	...	
21*a*	Herrings, fresh	3 lb		10	— 8 oz.	—	*5*
21*b*	*do.*, cured[6]	3 lb	1	0	+ 8 oz.	+	*1*
22	Sausages	...	...		— 8 oz.	—	*9½*
23	Apples	1 lb		6	+ 1 lb	+	*6*
24	Condiments	...	1	0	...	...	
	Cost of Group (*e*)		*15*	*3½*		*—1*	*9¼*
	Total Cost		**55**	**7**		+	**8**

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[1] The price unit is : eggs, one egg ; milk, one pint ; cocoa, ¼ lb packet ; condiments, total outlay ; all other foods, one lb. [2] Average price of inexpensive cuts. [3] 1¾ lb, 6d. [4] 7 lb, 1s. [5] Figs or dates. [6] Kippers or bloaters.

a low cost diet schedule compiled not for robots but for human beings, who like some change.

On account of the better supply of meat in November[1] we have omitted from the schedule ½ lb. of sausages, included in April. The daily nutritional intake per head would not, however, be much altered if either the fresh or the cured herrings were replaced wholly or partly by beef sausages, at 1s. 7d. a lb., outlay for outlay.[2] No allowance is made in Table I for the purchase of the sweet ration of 6½ ounces per head per week. In many families with children, habit has raised the sweet ration almost to the importance of a 'human need', which will be satisfied even if that necessitates the foregoing of some more essential food. On the whole the cheapest sweets were boiled sweets, at 2s. a lb. The full sweet ration for a family of 5 persons, of 2 lb. ½ oz., would thus have required an outlay of 4s. 1½d. To counterbalance the calorific intake from these sweets the foods that could be omitted from the diet schedule in Table I without causing any serious deterioration, would be all the rice, syrup, and dried fruit. This would bring down the increase in cost resulting from the purchase of the sweet ration, to 1s. 11½d. per week.

The nutritional requirements and the nutritional intake from the human needs diet, for calories, protein, calcium, iron, and the vitamins A, B_1, and C, are shown in Table II. The intake of essential nutrients from the diet would certainly be as good as that from many a far more expensive diet, and would provide a very satisfactory margin of safety in the case of most of the nutrients. Of the 85 gm. of protein supplied by the diet per Male Adult Equivalent per day, 42½ per cent are of animal origin (Table III); this represents about 51½ per cent of the total protein requirements. All the foods that are sources of animal protein are shown in the upper section of Table III, while those in the lower section provide either vegetable protein or no protein at all. Table III gives the figures of relative nutritive values only for calories, protein, calcium,

TABLE II

Nutritional Requirements and Intake from 'Human Needs' Diet

	Nutritional Requirements per Day				MAE[2] of Fam. of 5 Persons	Intake from Diet per MAE per Day
	Husband	Wife	Children 7—12 years[1]	Children 5 years		
Calories	3000	2500	2100	1500	3.73	3100
Protein, gm. ...	70	60	65	50	4.43	85
Calcium, gm. ...	0.8	0.8	1.4	1.3	7.13	0.6
Iron, mgm. ...	10	10	13	8	5.40	13
Vitamin A, Intern. Units	3000	3000	3000	3000	5.00	3850
Vitamin B_1, mgm.	0.90	0.75	0.95	0.68	4.68	1.6
Vitamin C, mgm.	30	30	30	30	5.00	52

[1] 2 children in this age group. [2] Male Adult Equivalent.

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[1] The meat ration in November was 1s. 5d. worth per head per week, which, for a family of 5 persons, could be laid out as follows: 2 lb. of roasting meat at 1s. 10d.; 1 lb. of minced meat at 1s. 8d.; 1½ lb. of stewing meat at 1s. 2d. a lb.

[2] The intake of animal protein would be reduced by between 1 gm. and 1½ gm., if either all the fresh or all the cured herrings were thus replaced.

TABLE III

Relative Cost and Nutritional Intake

	Outlay	Calories	Protein	Calcium	Iron
	%	%	%	%	%
1 & 2[1] Meat and Bacon ...	16.7	8.3	12.7	0.9	13.8
21 Herrings, fresh & cured	10.0	3.6	10.8	5.8	5.7
8 Eggs	3.3	0.5	1.2	0.5	1.3
7 Cheese	1.0	1.1	2.0	5.7	0.3
9*a* Milk, ordinary	14.8	7.6	12.3	40.1	2.2
9*b* *do.*, school	—	2.1	3.4	11.1	0.6
	45.8	23.2	42.4	64.1	23.9
10 & 11 Bread and Flour ...	11.7	32.2	33.2	19.1	36.4
15 Rolled Oats	3.4	5.5	5.2	2.1	9.6
16 & 17 All other Cereals ...	4.3	5.8	4.7	0.7	2.5
14 Legumes	2.5	2.4	6.1	2.1	7.9
12 Potatoes	5.4	6.7	5.1	2.2	6 7
13 Other fresh Vegetables	7.7	1.3	2.1	8.5	6.5
5 Sugar	2.8	6.7	—	—	—
18*b* Syrup	1.5	1.6	0.1	0.4	1.3
3 & 4 All Fats	6.0	12.6	—	—	—
18*a*, 19, 20, 23	4.1	2.0	1.1	0.8	5.2
	49.4	76.8	57.6	35.9	76.1
6 & 24 Tea and Condiments ...	4.8				
Total	100.0	100.0	100.0	100.0	100.0

[1] The serial numbers correspond to those in Table I.

and iron, Table IV showing the supplementary figures for the vitamins. The fresh vegetables, whose figures of cost on the one hand, and of caloric and protein values on the other, compare rather unfavourably in Table III, come into their own in Table IV: they are important and, indeed, indispensable sources of vitamins. Both Table III and Table IV bring out the value of milk as a well balanced food, except for its low content of of iron.

TABLE IV

Vitamins from 'Human Needs' Diet

A		B$_1$		C	
	%		%		%
13*a*[1] Carrots ...	63	10 & 11 Bread and Flour ...	39	13*c* Cabbage[2] ...	40
3 Margarine	15	12 Potatoes ...	17	12 Potatoes[2]	37
9 Milk ...	10	9 Milk ...	12	13*b* Swedes[2] ...	11
13*c* Cabbage ...	5	15 Rolled Oats	10	9 Milk ...	8
21 Herrings	2	14 Legumes ...	6	13*a* Carrots[2] ...	3
	95		84		99
All other Foods	5		16		1
	100		100		100

[1] The serial numbers correspond to those in Table I.

[2] 50 % of Vitamin C content deducted to allow for loss in cooking.

In Table V we have calculated how much of a food in Table I had to be bought—in terms of money—in order to obtain from it either 1000 calories or 100 gm. of protein. We have selected for this comparison only the more important calorific and protein foods; cheese and eggs have been omitted on account of the smallness of the rations. Eggs are a very dear food both as regards calories and protein, but cheese at 1s. 2d. a lb. was a very inexpensive source of animal protein, yielding 100 gm. of it for an outlay of just over 1s. Next to cheese, the most economic source of animal protein was herrings. The vegetable protein from potatoes cost almost as much as the animal protein from meat,[1] although the actual prices of these foods were 1¾d. for a lb. of potatoes and 1s. 7d. for a lb. of meat. Potatoes however not only provide calories at a fairly low cost but further are a very important source of vitamin C, especially during and soon after the harvest; towards the end of the season much of their content of this vitamin is lost.

TABLE V

Cost of Calories and Protein

	1000 Calories	100 gm. Protein
1[1] Meat	1s. 6d.	2s. 4d
20 Herrings, fresh and cured	1s. 11d.	1. 11¼d.
9*a* Milk, ordinary	1s. 4¼d.	2s. 6½d.
10 & 11 Bread and Flour	3d.	9d.
15 Rolled Oats	5d.	1s. 4½d.
16*b* Semolina	5d.	1s. 3½d.
14*a* & *b* Peas and Beans	8¾d.	10¼d.
12 Potatoes	6¾d.	2s. 2¾d.
5 Sugar	3½d.	—[2]
18*b* Syrup	7¾d.	—[3]
3 & 4 Margarine and Cooking Fat	4d.	—[3]
Beef Sausages[4]	1s. 7½d.	3s. 0½d.

[1] The serial numbers correspond to those in Table I.
[2] Contains no protein.
[3] Contain only insignificant amounts of protein.
[4] At 1s. 7d. a ℔.

Shopping for the 'human needs' diet did not prove very difficult in November, although it did require a certain degree of adaptability if it was to be done as economically as possible. This was particularly true of purchases of meat and fish. The firm intention to buy kippers but to refuse bloaters, or to insist upon a special cut or a special kind of meat, could easily have cost the housewife quite a few pence more, or could have curtailed the weight of her meat ration, thus compelling her to spend more money on meat substitutes. Otherwise, if the money allowance were strictly limited, the family diet would have suffered. On the other hand, it was possible—though not easy—for a very skilful housewife to reduce the cost of the diet by a few pence.

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[1] Meat has been assumed to supply on the average per ounce 66 calories and 4.2 gm. of protein.

T. SCHULZ.

A NOTE ON FEDERAL RESERVE POLICY

In recent years attempts have been made to restore the fallen prestige of interest rates as the main weapon of maintaining the balance in the economic system. In this connection it is urged that higher rates of interest differentiate delicately between borrowers according to the urgency of their needs. And it is claimed that in the U.S. a complete demonstration of this homely but neglected truth has been successfully accomplished. In the following this claim will be analysed.

On March 8th, 1951, after an intense, acrimonious and surprisingly public struggle[1] it was announced officially that 'The Treasury and the Federal Reserve System have reached full accord with respect to debt-management and monetary policies to be pursued in furthering their common purpose to assure the successful financing of the Government's requirements and, at the same time, to minimize monetization of the public debt'.

In accordance with this agreement, the outstanding $2\frac{1}{2}$ per cent Treasury Bonds were converted into a new type of Government security, with rather complicated maturity provisions. This new security, which carried the slightly increased rate of interest of $2\frac{3}{4}$ per cent, was non-redeemable, non-marketable, and non-transferable, for thirty years. The Treasury, however, granted the privilege to the holders, of exchanging the security at their option, into five-year saleable $1\frac{1}{2}$ per cent Treasury Notes. The exchange is to take place at par, with suitable adjustment for accrued interest. There is, of course, no guarantee that the Notes can be sold at or above par.

Once this agreement was announced, the Federal Reserve System withdrew its previous support from the long-term Government security market. (Table I). In consequence, the yield on long-term Government securities, increased from 2.4 per cent in February 1951, to 2.63 per cent in May, and has remained at about that level since. The yields on corporate bonds showed an analogous movement. At the same time, the yield on Treasury Bills increased with some fluctuations from 1.4 per cent (three-months Bills), to roughly 1.6 per cent. The increase in the rate on three to five year issues, was from 1.67 per cent to over 2 per cent, both absolutely and proportionally much sharper than either the increase in short or in long-term securities.

The total private holdings of deposits and currency, declined by $ 2.5 billions in the first half of 1951. This development was partly seasonal in character. (Table II). In the same period of 1950, prior to the outbreak of the Korean war, but with a vigorous recovery proceeding, money supply only increased by $ 0.2 billions. Nevertheless, the change in the trend is marked, as the contraction came after an expansion of not less than $ 7.2 billion in the second half of 1950. It has been claimed that this change was due mainly to the successful insistence of the Federal Reserve System on withdrawing support from the Government security market. Moreover, the additional

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[1] Cf. J. S. Fforde, The Monetary Controversy in the U.S. Oxford Economic Papers. New Series, Vol. 3, No. 3, pp. 221–240.

TABLE I

Interest rates in U.S.[1]

	Bank rates on business loans in N.Y. City	Yield in U.S. Govt. Sect. 3 months bills	3–5 years taxable issues	Domestic Private Bonds		U.S. Treasury bonds,
				Domestic Aaa rating	Corporate Baa rating	
	%	%	%	%	%	%
1950						
January ...		1.172	1.45	2.65	3.32	2.34
April ...		1.211	1.45	2.61	3.23	2.33
September ...	2.32	1.315	1.55	2.64	3.21	2.36
October ...		1.329	1.65	2.67	3.22	2.38
November ...		1.364	1.62	2.67	3.22	2.38
December ...	2.51	1.367	1.64	2.67	3.20	2.39
1951						
January ...		1.387	1.66	2.66	3.17	2.39
February ...		1.391	1.67	2.66	3.16	2.40
March ...	2.74	1.422	1.86	2.78	3.23	2.47
April ...		1.520	2.03	2.87	3.35	2.56
May ...		1.578	2.04	2.89	3.40	2.63
June ...	2.78	1.499	2.00	2.94	3.49	2.65
July ...		1.593	1.94	2.94	3.53	2.63
August ...		1.644	1.89	2.88	3.50	2.57

[1] All tables from the *Survey of Current Business.*

TABLE II

Banking Developments

		Reserve bank credit outstanding	Member Banks		Total Loans
			Demand deposits adjusted	U.S. Govt. oblig. direct + guaranteed	
		$ Billions	$ Billions	$ Billions	$ Billions
1950	January ...	18.5	48.3	35.5	26.4
	April ...	18.8	49.0	35.1	27.3
	September ...	20.3	49.2	33.8	28.5
	October ...	19.8	49.5	33.5	29.4
	November ...	20.6	50.5	33.0	30.6
	December ...	22.2	51.6	33.3	31.4
1951	January ...	23.1	51.2	31.6	31.5
	February ...	23.2	50.6	30.8	32.2
	March ...	24.2	49.5	30.9	32.7
	April ...	23.6	50.2	30.8	32.7
	May ...	23.5	50.0	30.4	32.4
	June ...	24.0	49.9	31.2	32.9
	July ...	24.0	50.4	31.0	32.5
	August ...	24.3	51.0	30.9	32.9

claim is made that the slowing-down of the increase in money supply had an appreciable influence in checking the continuance of the inflationary movement. It is suggested, moreover, that the American experience shows that even a slight variation in the rate of interest is sufficient to check the expansion of credit. On the basis of this lesson, we are recommended to undertake similar experiments in this country.

There can be no doubt that the violent expansion in credit which took place in the second half of 1950 has come to an end. It should in the first place be noted that this expansion coincided and was probably the result of the violent re-stocking due to the war scare produced first by the outbreak of the Korean war and once again by the intervention of China. (Table III). Therefore one would have expected a slowing down in the process once it was realised that a general war would not necessarily break out. Thus it is by no means obvious that the increase in the rate of interest played an important role in the reversal of the trend. On the contrary there are good reasons why the sweeping claims for the importance of interest rates should be rejected.

TABLE III

Business Sales and Inventories

		Business sales (adjusted) $ Billions	Business Inventories — $ Billions
1950	January	42.0	53.2
	April	45.3	54.5
	September	42.1	56.4
	October	41.8	58.7
	November	41.3	60.3
	December	42.5	61.6
1951	January	46.7	63.4
	February	45.4	64.4
	March	45.2	66.5
	April	43.5	68.6
	May	45.6	69.9
	June	44.3	70.5
	July	42.5	70.7
	August	42.8	70.0

An analysis of the American national income statistics shows that the war-scare which led to over-stocking and an acute demand for short term finance was already beginning to peter out before the intervention of the Federal Reserve System. (Table V). The increase in inventories held by manufacturers and distributors which began after Korea was at first voluntary and anticipatory. This is shown by the fact that it proceeded *pari passu* with an increase in sales. This was no longer the case in the first half of this year. We must suspect therefore that the further expansion of stocks must at least partly have been involuntary. This would result in first stabilising then diminishing demand for bank loans as they would be paid off from current profits. Thus the elimination of the most important cause of the inflationary rise in prices (and of the expansion of credit) was due little, if at all, to the change in credit policy.

The second important factor, the emergence of a large budget surplus was an automatic consequence of the recovery. Finally the loss of gold to foreign countries was an important deflationary factor.

It could be argued however that the credit policy exercised severe restraint on real estate housing and consumer credit and thus played an important role

TABLE IV

National Income Determinants

	Private domestic investment	Govt. purchases of goods and services	Federal Government outlay less sales	Change in Inventories	New Plant and Equipment
	$ Billions per annum				
1950 January					
April ...					
September	47.3	40.8	21.2	—0.7	18.8
October ...					
November					
December	60.2	47.8	27.3	11.8	23.3
1951 January					
February					
March ...	59.6	52.9	31.9	9.3	20.6
April ...					
May ...					
June ...	63.5	60.0	38.5	14.4	25.0
July ...					
August ...					27.2

TABLE V

Federal Government Finance

		Receipts — Expenditures $ Millions
1950	January	—.865
	April	723
	September	1322
	October	— 870
	November	082
	December	732
1951	January	813
	February	1609
	March	4753
	April	— 718
	May	— 478
	June	1907
	July	—1906
	August	— 922

in checking inflation. There is some justification in that claim. (Table VI). But controls over real estate and consumer credit were in the main, *direct* controls imposed on the basis of the newly-voted Defence Powers, which enabled the Federal Reserve System to regulate conditions and down-payment and length of amortisation. The increase in down-payments was especially effective in restraining consumer demand, the more, since previously that demand had been exceptionally stimulated by the almost unlimited power of guaranteeing mortgages given to the Veterans' Administration. No one has suggested that such controls lack in effectiveness.

Thus, even in this limited field, the claims of those who attribute the impressive efficiency of credit policy to the induced changes in the rates of

TABLE VI

Construction and Consumers' Finance

	New Construction	New dwelling units and Urban building	New Mortgage	Consumer credit outstanding
	$ Billions	$ Millions	$ Millions	$ Billions
1950 January ...	2.70	144.4		18.8
April	2.82	141.9	556	19.3
September ...	2.85	120.6	467	19.4
October ...	2.77	102.5	450	19.4
November ...	2.57	87.3	394	20.1
December ...	2.23	93.6	371	
1951 January ...	2.10	85.9	384	19.9
February ...	1.97	80.6	351	19.5
March	2.19	93.8	440	19.4
April	2.39	96.2	438	19.1
May	2.56	107.0	475	19.2
June	2.73	132.5	474	19.3
July	2.79	86.0	440	19.1
August ...	2.84	85.0	486	19.3

interest, cannot be sustained. Nor is this the whole story. Doubtless *new* commitments in real estate financing by the great insurance companies, and to some extent also, by banks, have been substantially restricted. It would be a mistake to think, however, that this was due to the effect on demand of the increase in the rate of interest. Such mortgages and similar loans always carried a substantially higher yield than Government Bonds, even after the fall in their prices. The increase in the rate of interest would not affect this difference. On the other hand losses sustained by the financing agency on selling Government bonds in order to increase real estate loans (or consumer credit) could easily have been made good out of the increase in current revenue due to the higher rates charged for the latter. This applied *a fortiori* to the sale of short or medium term Government securities, on which the losses would be smaller and the difference in interest rates larger, and as we have seen, the pressure on prices was greatest in these types. Moreover, under American legislation, capital losses can be offset against capital gains. At the present rate of corporate taxation, the deterrent effect of such losses would, therefore be very small.

The explanation of why the policy of the Federal Reserve Board in stopping the ' monetization ' of the public debt succeeded relatively well is so simple that it has been generally neglected. Federal legislation in the U.S. requires companies realising losses *to show these losses in their balance-sheets even if they are covered by hidden reserves, or offset by capital gains. Companies in America, and most of all insurance companies and banks, however, seem anxious not to show such losses in their balance sheets.* A depreciation of Government securities below par thus has an effect far beyond the usual price effect—and one which is certainly not paralleled in countries where banks' and insurance companies' sensibilities against taking temporary losses are less acute than in the United States. The increase in the rate of interest, far from *encouraging lending and deterring borrowers*, *cuts off lending altogether*, while leaving borrowers unaffected, a phenomenon which is hardly contemplated in any theory of price, and certainly not envisaged by those who were so successful in advocating the adoption of similar policies in this country —forgetting that, far from being rigid, the long term rate of interest in this country has increased faster and further than in any period of similar length in recorded history, without any apparent result either on borrowing or on consumption.

It could reasonably be asked what induced the Federal Reserve to insist on so complicated a conversion operation as that described above. The answer is fairly clear. First of all, a *type* of security had to be offered which had *no precedent*, so as to spare the face of the Treasury in increasing the rate of interest from 2½ per cent to 2¾ per cent. Having an unmarketable security provided this excuse without appearing to abandon the stand against dearer money. An unmarketable security, however, would certainly not be taken by the banks or even insurance companies. Therefore some provision had to be made for an escape route. This explains the convertibility of the new bond into the five-year *marketable* Treasury Notes. This device enabled the Federal Reserve System to continue to sustain the *long-term rate* of interest by intermittent intervention, even though the fixed peg on long term issues was removed, and to let the price of the Notes sink slightly below par by operations in the *medium or short-term market*, and thus *immobilise the whole new issue*. The complicated sleight of hand becomes at once highly rational and easily comprehensible if these factors are taken into consideration. The upholders of the effectiveness of bank rate, however, can derive little, if any, solace, from this more detailed analysis of the American case.

T. Balogh

PERSONAL INCOMES IN OXFORD

In a previous paper in this BULLETIN[1] an outline was given of the principal results of the survey of incomes and savings conducted in Oxford in April–May 1951. In this paper we take up in fuller detail the analysis of the information relating to personal incomes, their distribution for various types of spending unit, changes in income from one year to the next, and related matters.

INTRODUCTION

The purposes of the pilot survey were explained in the earlier paper: they were to find out whether a survey of this type was practicable in this country and to analyse the results so as to show what sort of information could be extracted from them. The writing up of these results is therefore, in a sense, part of the exercise. The information derived from a sample of people in Oxford is obviously of limited value in itself; there is no way of knowing whether conditions in Oxford are typical of conditions in the country at large; but the writing up of the Oxford results can suggest possible relations, lines of thought and problems which should be pursued—perhaps in greater detail or with more thoroughness—in a national survey. This national survey is now in process of being planned, and it is hoped that the publication of this series of papers on the Oxford survey will provoke criticisms and suggestions from those who are interested in the information that a national survey of incomes and savings can be expected to provide.

These considerations have prompted us to push ahead with the publication of these papers as quickly as possible. It will be seen below that some of our calculations (especially those relating to sampling errors) are incomplete; but we have thought it preferable to provide the bulk of the meal soon, without all its trimmings, rather than run the risk of finding that, when it is served up later, the appetite will have waned.

METHODS

We shall not attempt to summarise here the methods used in the pilot survey ; they were fully explained in the earlier paper. It will be sufficient to recall that the information was collected by interviewers from a stratified sample of 416 ' spending units ', the spending unit being defined as follows : each person of 18 years or over is a separate spending unit, except that a wife forms part of her husband's spending unit ; children under 18 are included in the spending unit of their parents.

When a sample of 416 spending units is broken down into a set of sub-samples according to one characteristic, *e.g.*, the occupation of the head of the spending unit, there will obviously be fewer units in each sub-sample : and if these sub-samples in turn are analysed by some attribute or variable, *e.g.*, the total income of the spending unit, the estimates of the proportion of spending units falling in each ' cell ' or of means or other parameters of the distribution will be subject to greater margins of error than in the analysis of the full sample. This consideration clearly limits the degree to which the data can be broken down ; and it must always be a matter of judgment how far this sort of analysis should be taken. We have tried to resist the temptation to push the analysis too far and to confine it to sub-samples of a size that may reasonably be described as ' large ' samples.[1]

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[1] 'A Pilot Survey of Incomes and Savings', BULLETIN, Vol. 13, No. 9.

Some Points About Errors

It is an essential principle in the reporting of sample surveys that clear indications should be given of the errors to which the data are subject. These errors are not, unfortunately, only the errors that arise from the process of sampling as such ; there are also errors, which may be considerable, that arise from non-response and from inaccurate reporting and processing of results. It is however difficult to estimate the importance of errors of the latter type. We observed in the previous paper that people with their own businesses appeared to be less responsive than the rest of the population and that they were probably under-represented in our sample. No correction has been made for this factor because it is not certain how important it is. On the other hand it was fairly definitely established that elderly women (of about 60 and over) living in stratum 1 (large houses) were a good deal less responsive than the rest of the population. To offset this effect the results obtained from spending units of this sort who did respond have been weighted up in the analysis made in this and succeeding papers.

On the subject of sampling error there should be less room for doubt. A scientifically constructed sample provides information from which estimates can be made of the degree of confidence that can be placed in the sample results themselves. The standard errors of sampling can be worked out for each of the figures printed in the following tables. Unfortunately, however, the computing of each of these standard errors is, for a sample drawn in the rather complex manner of this sample, a considerable task in itself. The work has yet to be done; and it will take a good deal of time. Meantime, we must be content with a rather broad generalisation on the subject of sampling error.

The difficulty arises because the sample selected was, for very important reasons, not a purely proportionate random sample of the population. Had it been so, the standard errors of sampling could have been computed by the well-known formulae applicable to this case. But the introduction of complexities into the sampling procedure—especially the use of a variable sampling fraction within strata—makes the computation of standard errors much more difficult. When we were dealing with estimates derived from the whole sample we were able to assume with some reason that the standard errors of the actual method of sampling employed would be less than those appropriate to a random sample of the same number of spending units. This gave us an outside estimate of the actual sampling errors.[1] But in the analyses that are made in this and the succeeding papers we shall be dealing principally with distributions of attributes of variables within ' domains of study ', *i.e.*, within specified portions of the total sample. An example of such a domain of study is the population of spending units whose heads are skilled workers. Within each stratum there may be a varying proportion of spending units of this type. In any case there will be only a proportion; and no control was exercised in the selection of the sample to ensure that the proportion of the skilled worker spending units in each stratum was identical with that existing in the population. For this reason the standard error of sampling of the characteristics of a domain will not be as small as it would be if the sample had been stratified for that domain.

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[1] In the sense of the statistical theory of large samples.

This in itself is not so serious; but a more serious problem arises from the use of a varying sampling rate. It could happen that in a certain domain the units with the greatest variability would be found in those strata which are sampled at a low rate, and *vice versa*. In such circumstances the standard errors of the estimates for that domain would be greater than in a random sample of the same size. For example, manual workers living in large houses (as domestic servants) may have less varied incomes than manual workers living in small houses with their own families. Yet large houses have been sampled in this survey more intensively than small ones. The effect of this sort of relation would be to increase the standard error of the estimate of mean income of manual workers; and it might even become larger than the standard error appropriate to a random sample of the same size.

In the above paragraph we have deliberately considered an extreme example. Such a situation, however, is likely to be exceptional; in general there are good grounds for believing that spending units vary more widely in the upper strata than in the lower, even within domains. In the case of estimates of proportions the standard error within each stratum varies with the proportion; it is at its maximum when the proportion is 50 per cent, at its minimum when the proportion is 0 per cent. Within a range of about 30 per cent to 70 per cent the standard error of a proportion is very stable. Difficulties could arise in a case where there were a very small (or very large) proportion of spending units in the top stratum with a certain attribute and about half the spending units in the bottom stratum with the same attribute.

For the time being we are compelled to ignore these possibilities and to work on the broad assumption that the standard errors within domains are not likely to be very different from those that would be obtained from a random sample consisting of the same number of spending units. Table I shows the sampling error of a proportion in random samples of various sizes. ' Sampling error ' is a convenient term to denote the range within which the proportion in the population can be estimated with confidence to lie. The ' sampling error ' in this case is twice the standard error of sampling, so that the degree of confidence with which the range can be accepted is 95

[1] See the appendix to the previous article, *loc. cit.*

per cent. In other words, estimates within this range can be expected to be right 95 times out of 100.

The sampling errors given in the table are expressed in percentages, rounded to the nearest whole number. They are intended as a rough guide to the significance of the figures presented in this paper. With the help of the table it is also possible to compute the sampling error of the difference between two percentages. The appropriate formula is :

TABLE I

Random sampling error of a proportion[1]
(in percentages)

Proportion in sample	*Number of spending units in sample*			
	400	*200*	*100*	*50*
50 per cent	5	7	10	14
40 or 60 per cent	5	7	10	14
30 or 70 per cent	5	6	9	13
20 or 80 per cent	4	6	8	11
10 or 90 per cent	3	4	6	8

[1] 'Sampling error' is twice the standard error of sampling ; the proportion in the population can be expected to lie within this range of the proportion found in the sample 95 times out of 100.

$$S_d^2 = S_1^2 + S_2^2$$

where S_d denotes the sampling error of the difference, S_1 the sampling error of the first percentage and S_2 the sampling error of the second percentage.[1] A similar formula can be used to compute the standard error of the difference of two means, the standard error of each mean having first been computed by dividing the standard deviation of the sample by the square-root of the number of spending units in the sample.

CLASSIFICATION OF SPENDING UNITS

In the previous paper we gave the distributions for all spending units of such variables as income, asset holding and saving. In this and succeeding papers we shall analyse these distributions within sub-samples of the total population, grouping spending units by such characteristics as occupation, industry, age and sex.

Table II shows the distribution of spending units by the occupation,[2] industry and age of the head of the spending unit; the analysis is made separately for male heads, for female heads and for both sexes combined. The heads of 52 per cent of all spending units are manual workers; 31 per cent are salaried or self-employed; 17 per cent are retired, unoccupied or unem-

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[1] For example in Table II it is estimated that 11 per cent of semi-skilled (machine) worker heads of spending units are female against 50 per cent of the clerical, shop assistant, etc. heads of spending units. $S_1 = 8$ per cent approx ; $S_2 = 14$ per cent approx ; $S_d^2 = 64 + 196 = 260$. $S_d = 16$ per cent approx.

The actual difference (50—11 = 39) can therefore be regarded with some confidence as reflecting a real difference in the population.

[2] The occupational classification is explained in the appendix.

TABLE II. *The distribution of spending units by occupation, industry and age of the head, analysed by male and female heads separ and the per cent of male and female heads in each category*

Characteristic of spending unit	*Percentage distribution of spending units*			*Per cent of male and female heads in each category*			*Number of spending units in sample*
	All spending units	*Spending units with male heads*	*Spending units with female heads*	*Male*	*Female*	*Total*	
All spending units	100	100	100	70	30	100	416
Occupation of head of spending unit :							
All manual workers	*52*	*64*	*25*	*85*	*15*	*100*	*174*
Skilled	17	24	2	96	4	100	58
Semi-skilled (machine)	12	15	4	89	11	100	34
Semi-skilled (other)	13	16	7	84	16	100	52
Unskilled	10	9	12	64	36	100	30
All salaried and self-employed	*31*	*28*	*37*	*64*	*36*	*100*	*166*
Clerical, shop assistants and commercial travellers	11	8	18	50	50	100	46
Managers, professional and technical employees	14	13	15	67	33	100	85
Self-employed in business or professional work	6	7	4	80	20	100	35
Retired, unoccupied and unemployed	*17*	*8*	*38*	*33*	67	*100*	*76*
	100	100	100				
Industry of head of spending unit :							
Manufacturing, building and agriculture...	42	55	12	91	9	100	138
Services	40	36	50	63	37	100	195
Not working...	18	9	38	36	64	100	83
	100	100	100				
Age of head of spending unit :							
18 to 29	19	16	24	60	40	100	81
30 to 39	21	27	7	90	10	100	83
40 to 49	19	20	16	74	26	100	79
50 to 59	15	17	11	79	21	100	68
60 to 69	15	12	23	54	46	100	61
70 and over	11	8	19	50	50	100	44
	100	100	100				
Number in sample	416	273	143				

Note.—Percentage distributions in this and subsequent tables do not always add to exactly 100. This is due to the rounding of components to the nearest whole number.

ployed. The number of unemployed is negligible (less than 1 per cent). Amongst the males there is a larger proportion of manual workers (64 per cent) and a smaller proportion retired or unoccupied (8 per cent). Amongst females the opposite relation holds. The same facts can be seen more clearly from the right hand part of the table where the percentage of male and female heads within each occupation is given. While the proportion of female heads amongst all spending units is 30 per cent, the proportion amongst manual worker heads is only 15 per cent and the proportion amongst retired and unoccupied heads is 67 per cent. Within the manual worker group there is a marked variation in the proportion of female heads : only 4 per cent of skilled worker heads are females, 11 per cent of the semi-skilled (machine) heads, 16 per cent of other semi-skilled and 36 per cent of the unskilled. Female heads of spending units, clearly, are not employed to the same degree as males in work requiring manual skill. On the other hand the proportion of female heads engaged in clerical work and as shop assistants (50 per cent) is above the average and the proportion engaged as managers, professional or technical employees (33 per cent) is not significantly different from the average.

Turning now to the classification by industry, we find that about two-fifths of heads of spending units in Oxford are engaged in industry (including a few in agriculture), the same proportion in service trades, and the remaining one-fifth are not working.[1] Of the heads of spending units engaged in industry 91 per cent are males and 9 per cent females; on the other hand, of the heads not working only one-third are males and two-thirds females.

When heads of spending units are classified by age it appears that 26 per cent of them are 60 and over; amongst the females alone however, 42 per cent are in this group. Female heads represent as much as 40 per cent of all heads under 30; but the proportion drops to 10 per cent of the heads aged 30 to 39, from which point it rises fairly steadily from one age group to the next. This is due to the fact that women who marry cease to be heads of spending units; but many recover this status in later life when their husbands have died or if, for some reason, their husbands are not living with them.

The Distribution of Total Income

In Table III we give the income distributions of spending units with heads of various kinds. Considering first the three broad groupings of occupations—(1) manual workers, (2) salaried and self-employed and (3) the retired and unoccupied—we observe that no manual worker spending units have incomes of £1,000 a year or over while amongst the salaried and self-employed 15 per cent are in this group and amongst the retired and unoccupied 10 per cent. The wider dispersion of incomes in the two latter classes is reflected in the size of their standard deviations; but whereas the

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[1] The slight discrepancy between the figures for those ' not working ' and those classified as ' retired, unoccupied and unemployed ' is due to the inclusion of a small number of graduate students in the former category and their exclusion from the latter. In the occupational classification graduate students were included with managers, professional and technical employees.

Table III

Income distribution of spending units having specified characteristics
(per cent of spending units of each type)

Characteristic of spending unit	*Total income of spending units*						*All spending units*			
	Under £200	*£200 to £399*	*£400 to £599*	*£600 to £999*	*£1,000 to £1,999*	*£2,000 and over*	*Per cent*	*Number in sample*	*Mean £*	*Standard Deviation £*
All spending units	17	35	29	13	5	2	100	416	469	457
Occupation of head of spending unit:										
All manual workers	*7*	*46*	*34*	*13*	—	—	*100*	*174*	*401*	*154*
Skilled	2	31	57	9	—	—	100	58	444	124
Semi-skilled (machine occupations)	2	32	38	29	—	—	100	34	485	161
Semi-skilled (other occupations)	14	56	19	11	—	—	100	52	361	152
Unskilled	15	74	12	—	—	—	100	30	281	93
All salaried and self-employed ...	*14*	*24*	*29*	*18*	*12*	*3*	*100*	*166*	*643*	*584*
Clerical, shop assistants etc. ...	27	32	25	17	—	—	100	46	374	211
Managers, professional and technical employees	3	22	34	18	19	5	100	85	786	630
Self-employed	16	13	25	20	20	7	100	35	798	739
Retired, unoccupied or unemployed	*50*	*25*	*13*	*3*	*7*	*3*	*100*	*76*	*363*	*536*
Industry of head of spending unit:										
Manufacturing, building and agriculture	5	32	45	15	3	1	100	138	479	272
Services	15	43	20	13	6	2	100	195	502	489
Not working	47	26	12	5	7	2	100	83	372	524
Age of head of spending unit:										
18 to 29	21	47	14	15	3	—	100	81	397	279
30 to 39	2	30	48	15	4	1	100	83	519	330
40 to 49	4	31	38	17	10	1	100	79	564	384
50 to 59	11	40	29	14	2	5	100	68	545	600
60 to 69	25	43	18	5	7	2	100	61	431	488
70 and over	55	21	16	5	3	1	100	44	284	373
Sex of head of spending unit:										
Male	6	33	36	17	5	2	100	273	538	434
Female	40	41	12	2	4	1	100	143	307	345

salaried and self-employed have an average income of £643, which exceeds by a comfortable margin the average income of manual workers (£401), the retired and unoccupied have an average income below that of manual workers. This is due to the concentration of half the retired and unoccupied in the lowest income group (under £200).

If we consider the four categories of manual workers, divided according to skill, we find that the spending units whose heads are skilled and semi-skilled (machine) workers have a rather similar distribution. The modal income in each case is in the range £400 to £599; but whereas 57 per cent of the spending units with skilled heads are in this group only 38 per cent of those with semi-skilled (machine) heads are in the group and 29 per cent of the latter have incomes of £600 or more. This difference is reflected in a higher standard deviation for the latter category and a higher mean income. The difference in mean income, although not significant at the 5 per cent level, would occur only about once in five times in random samples drawn from two populations with identical means and the given standard deviations. It seems very likely, therefore, that spending units whose heads are semi-skilled (machine) workers have larger total incomes on the average than spending units whose heads are skilled workers. Why should this be so ? Is it because spending units of the former type have more earners than those of the latter type; or is it because they enjoy higher incomes per earner ? From Table IV it will be seen that the first hypothesis is not verified : skilled worker spending units actually have more earners per spending unit than semi-skilled (machine) worker spending units. It seems probable therefore that semi-skilled (machine) workers in Oxford earn more on the average than skilled workers.

This does not mean that skilled workers would be earning less than semi-skilled (machine) workers *in the same factory*, or even in the same industry. The most probable explanation is the particular way in which skilled and semi-skilled workers in Oxford are distributed between industries : the great majority of the semi-skilled (machine) workers are employed at Morris's and Pressed Steel, where earnings are fairly high, while skilled workers are employed in a wide variety of industries, as can be seen from the list of examples of skilled workers given in the appendix.

Compared with the two classes of manual worker spending units discussed so far the other manual worker spending units are distinctly worse off. The modal income of spending units whose head is a semi-skilled worker (other occupations) is in the range £200 to £399 and the mean is £361; the modal income for those with unskilled heads is in the same group but the mean in their case is only £281. In general, manual worker spending units have a low standard deviation; their incomes are closely grouped about the mean. This is especially marked in the case of the unskilled workers.

Within the group of salaried and self-employed the clerical workers, shop assistants and commercial travellers have an income distribution similar in many respects to that of manual workers, and their mean income is also similar. On the other hand, managers, professional and technical employees are widely dispersed : very few spending units with this kind of head have incomes of less than £200, 24 per cent have £1,000 or over and their mean income is £786. The self-employed have a mean income of similar size but they are even more widely dispersed : 16 per cent of spending units whose heads are self-employed have income of less than £200 while 27 per cent have £1,000 or over.

When spending units are arranged according to the age of the head an interesting pattern appears. Average income of those with heads aged 18 to 29 is about £400. For the next two age groups the average income rises; thereafter it declines, at first slowly and later quite rapidly. Maximum income, on the average, is reached when the head is in the age-group 40 to 49. This decline in average income after the age of 50 seems a little surprising. Some of the explanation undoubtedly lies in the variation in the number of income-receivers in the spending unit : as can be seen from Table IV, the average number of income-receivers reaches its maximum of 1.26 per spending unit for spending units with heads aged 40 to 49. Not all income-receivers, of course, are of equal importance, so that the average number per spending unit is only a rough measure of their effect on total income; but the spending unit whose head is in the 40's can expect to have more money coming in from children who have left school and have not yet reached the age of 18, and perhaps from a wife who can go out to work again for the same reason.

Finally, we must take note of the considerable difference between the income distributions of spending units with male and female heads : the latter are far more heavily concentrated in the low income groups, and their average income is just over half that of spending units with male heads. This differential in the income of spending units with male and female heads runs through all age and occupational groups. It arises not only from inequality of pay of males and females in the same occupation but also, as we have seen, from differences in the type of work in which males and females are employed, even within a single occupational group. It is partly due to the greater number of income-receivers in spending units with male heads than in those with female heads (see Table IV). It will be seen however, in the next section that the comparison of the incomes of spending units with male and female heads works out differently when the number of persons in the spending unit is taken into account.

INCOME-RECEIVERS AND INCOME PER PERSON

In Table IV there are presented for comparison the average income per spending unit, the average number of income-receivers per spending unit and the average total number of persons per spending unit. In the last column the average income per person is worked out. The number of income-receivers per spending unit (excluding those receiving less than £50 a year) does not vary very widely from its mean figure for all spending units of 1.14. Spending units with manual worker heads generally have more income-receivers; salaried workers have less, as do the retired and unoccupied. As the age of the head of the spending unit advances the number of income-receivers in the spending unit increases until the 40 to 49 age-group is reached; thereafter it declines again.

TABLE IV

Income-receivers and persons to be supported, of spending units of various types

Characteristic of spending unit	*Mean total income per spending unit*	*Number of persons per spending unit with separate incomes of £50 or over*	*Total number of persons per spending unit*	*Mean income per person*
	£			£
All spending units	469	1.14	2.38	197
Occupation of head of spending unit :				
Skilled worker	444	1.21	2.72	163
Semi-skilled (machine)	485	1.08	3.18	153
Semi-skilled (other)	361	1.28	2.93	123
Unskilled	281	1.20	2.38	118
Clerical, shop assistants, etc. ...	374	1.00	1.87	200
Managers, professional and technical employees	786	1.11	2.24	351
Self-employed	798	1.20	2.95	271
Retired, unoccupied and unemployed	363	1.04	1.33	273
Age of head of spending unit :				
18 to 29	397	1.08	1.77	224
30 to 39	519	1.11	3.44	151
40 to 49	564	1.26	3.14	180
50 to 59	545	1.17	2.34	233
60 to 69	431	1.14	1.56	276
70 and over	284	1.05	1.32	215
Sex of head of spending unit :				
Male	538	1.19	2.93	184
Female	307	1.02	1.13	272

The overall average number of persons per spending unit is 2.38. The average within different occupations varies quite considerably—from 3.18 persons in the spending units whose head is a semi-skilled (machine) worker to 1.33 persons in those whose head is retired or unoccupied. Some of this variation may be associated with the occupations themselves—or with the way of life that is typical of each occupation—but some is also the result of the varying proportions of male and female heads in each occupation. There is a marked contrast between the number of persons per spending unit in spending units with heads of different sex—2.93 persons per spending unit for male heads, 1.13 for female heads—and it is clear that this affects the occupational and age-group averages. It would have been useful to have analysed this problem in greater detail, but the sample is rather too small to support any firm conclusions.

In the final column of Table IV we have the average income per person for spending units of the various types. The general average is about £200.

Manual worker spending units have less than this: they range from £163 per person for skilled worker heads to £118 per person for unskilled worker heads. It is interesting to note that the effect of varying family size is to put the skilled workers on this basis at the top of the list of manual workers; the semi-skilled (machine) workers, despite having bigger incomes, have more children and their average income per person is reduced accordingly. The largest income per person—£351—is enjoyed by the spending units whose heads are managers, and professional and technical employees. They have high total incomes and fairly small families. The self-employed, on the other hand, with equally high total incomes, have larger families; their income per person is therefore less (£271). The retired and unoccupied, despite having small total incomes, support on the average so few people that their average income per person is relatively high (£273).

When spending units are analysed by the age of the head we find that the number of persons per spending unit rises rapidly from the first age-group (18 to 29) to the second (30 to 39) and then declines for the remaining groups. The variation in the number of persons per spending unit has a marked effect on the average income per person. Spending units whose heads are under 30 enjoy relatively high average incomes per person; but average income per person in the next age-group is much less, in fact at its lowest for any group.[1] After this age-group the size of the spending unit declines while total income at first increases. Average income per person increases steadily until the 60 to 69 age-group, at which level it is at its maximum. In the last group, the over 70's, the size of the spending unit continues to fall, but not so rapidly as total income. The over 70's are, on the average, not badly off; but the average is misleading because the distribution is very skew. As can be seen from Table III, the majority of the over 70's have a total income of less than £200; many have very small incomes indeed.

The effect of calculating income per person instead of income per spending unit is very remarkable in the case of the analysis by sex. Whereas spending units with female heads have much lower total incomes than those with male heads they support so many fewer persons on the average that the income per person of spending units with female heads is actually higher (£272) than the income per person of those with male heads (£184).

Distribution of Income per Person

If each person is considered to have an equal share in the total income of the spending unit to which he or she belongs, we can draw up a distribution of income per person. Table V shows the distribution of spending units and of persons according to the average income per person. It will be seen that both distributions are very skew; the mode in each case lies within the group

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[1] No account is taken here of the incidence of taxation on these groups; it would of course be desirable to carry out this analysis on the basis of disposable income as well as on a gross income basis as above.

£100–149 but there are a number of spending units (and persons) whose average income per person is much higher than this. The distributions would, of course, be different if we were considering disposable income instead of income before tax.

It is important to consider the people with low incomes per person. In Table VI we give the percentage of spending units of each size whose income per person is less than (1) £75 per person and (2) £100 per person. These annual figures are roughly equivalent to 30s. per week and £2 per week. It will be seen that the proportion of spending units whose income per person falls below either of these two levels rises steeply as the size of the spending unit increases. About half the large families, with 5 or more persons, have less than £100 per person. These families, as can be seen from the last column of Table VI, represent about 11 per cent of all spending units.

By virtue of the fact that a larger proportion of the large families have low average incomes per person the proportion of *persons* with low incomes is greater than the proportion of *spending units*; and the proportion of *children* in this category is greater still. Table VII shows the percentage of spending units, persons and children belonging to spending units whose average income per person is below specified levels. Very few spending units, persons or children are in spending units whose income per person is less than £50 a year (*i.e.*, £1 a week).

However, the proportion of each class whose income per person falls short of £75 a year (30s. a week) is considerable : 10 per cent of spending units, 18 per cent of persons and 31 per cent of children are in spending units of this type. A similar gradation can be observed for spending units whose income per person is less than £100 a year. One-quarter of the Oxford population is in this category and over 40 per cent of the children.

International Comparisons of Personal Income

An interesting by-product of a survey of this sort is the opportunity it gives for international comparisons. The Oxford survey was conducted on lines very similar to those used in the annual surveys in America conducted by The Survey Research Center of the University of Michigan. Although Oxford is not necessarily typical of the U.K., a comparison of Oxford and U.S. incomes will illustrate possible ways of using national figures. In Table VIII we have put side by side the income deciles of the U.S. (1950) and Oxford (1950–51). By dividing the Oxford deciles into the U.S. deciles we obtain a set of decile-ratios which can be regarded as a set of personal income exchange rates. The ratios vary over the income range—indicating that U.S, personal income is more unequally distributed than Oxford personal income —but they do not deviate very greatly from their average of 7.5. If we use this figure in place of the individual ratios we can say that broadly speaking a U.S. spending unit that occupies the same relative position in the U.S. income pyramid as that occupied by its opposite number in Oxford will receive $750 income for each £100 income received by the Oxford spending

TABLE V

Distribution of spending units and persons by income per person

Average income per person	*Per cent of spending units and persons in spending units with given incomes per person*	
	Spending units	*Persons*
Under £50	1	2
£50—99	16	24
£100—149	24	30
£150—199	16	16
£200—249	12	9
£250—299	10	6
£300—399	9	7
£400—499	5	3
£500 and over	8	4
All spending units	100	100

TABLE VI

Spending units with low average income per person, by size of spending unit

Number of persons in the spending unit	*Per cent of all spending units*			*Per cent of spending units falling in each size group*
	Income per person less than £75 a year	*Income per person less than £100 a year*	*All spending units*	
1	5	12	100	40
2	6	7	100	26
3	10	14	100	13
4	12	24	100	10
5	23	49	100	5
6 or more	47	55	100	6
Total	10	17	100	100

TABLE VII

Spending units persons and children in spending units with low average incomes per person

Class	*Percent of each class in spending units with income per person less than :*			*All*
	£50 a year	*£75 a year*	*£100 a year*	
Spending units ...	1	10	17	100
Persons	2	18	26	100
Children	4	31	43	100

unit.[1] It is well known that exchange rates do not necessarily measure the relative internal purchasing powers of different currencies; but it is nonetheless striking to find that, at the current official rate of exchange ($2.80 to the £), American spending units enjoy incomes in terms of sterling of between two and three times the size of their Oxford counterparts.

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[1] This method of comparison was suggested in the course of a discussion with Dr. J. B. Lansing of the Survey Research Center.

TABLE VIII

Income decile-ratio of spending units, United States and Oxford

	Spending unit income deciles		*Ratio of U.S. decile to Oxford decile**
	United States 1950	*Oxford 1950–51*	
	$	£	
Top decile ...	6210	750	8.3
Second	4950	590	8.4
Third	4080	490	8.3
Fourth	3550	435	8.2
Fifth	3000	395	7.6
Sixth	2510	340	7.4
Seventh ...	1990	280	7.1
Eighth	1430	220	6.5
Ninth	830	135	6.1

* Each ratio expresses the number of dollars received by a decile spending unit in the U.S. for each pound received by the equivalent decile spending unit in Oxford. The average of the nine ratios is 7.5.

CHANGE IN ECONOMIC CIRCUMSTANCES

In each interview the head of the spending unit was asked : ' Would you say you are better off or worse off now than you were a year ago ? ' The answers to this question give an indication of the changes in the economic circumstances of spending units between April 1950 and April 1951. Clearly these circumstances are influenced by many factors. Usually, the most important are the size of money income and the general price-level; but individuals may find themselves better off or worse off for other reasons, such as a change in family size or the number of earners, the occurrence of illness, capital gains or losses, and so forth.

How far are changes in the economic circumstances of spending units associated with changes in their money income ? In Table IX spending units are analysed by both attributes simultaneously and it becomes clear that the association between them is very strong. At the same time it is

TABLE IX

Effect of changes in total money income on the economic circumstances of spending units

Characteristic of spending unit	*Economic circumstances at time of interview compared with a year before*			*Total*	
	Better off	*About the same*	*Worse off*	*Per cent*	*Number in sample*
Change in income of spending unit between 1949–50 and 1950–51 :					
Increase	35	25	40	100	162
Income about the same	7	34	59	100	179
Decrease	2	10	88	100	71
All spending units ...	18	27	55	100	416*

* The change in income of 4 spending units was not ascertained.

noteworthy that there is a strong bias in all cases in the direction of being worse off. Thus 40 per cent of spending units who had had an increase in money income in 1950–51 compared with 1949–50 considered themselves worse off in April 1951. The reason given for this, in almost all cases, was the rising cost of living.

Change in Income

Each spending unit was asked to say whether its money income in 1950–51 had gone up or gone down, or was about the same as its income in 1949–50. If the income had gone up or down, it was asked to estimate the amount of the change. The answers to these questions are analysed in Table X. Each change in income has been expressed as a percentage of the estimated income of the spending unit in 1949–50. Those whose change in income worked out at less than 5 per cent in either direction were grouped with those who said their income in 1950–51 was ' about the same '. In addition to the analysis by percentage change in income the table shows the means and standard deviations of the actual changes reported; it is assumed for this purpose that those who said ' about the same ' had no change in income.

The broad picture is that 34 per cent of spending units had an increase of income of 5 per cent or more, 10 per cent had a decrease and 52 per cent had no substantial change. The mean change was an increase of £20 and the standard deviation is £92. When we analyse spending units according to the size of their 1949–50 incomes we find various cross-currents. First only a negligible proportion of spending units who started with incomes of less than £200 in 1949–50 suffered a diminution of income in 1950–51; 61 per cent of spending units of this sort had no substantial change in income and the remainder had an increase. But of those who had an increase a very large proportion (22 per cent of all spending units in this group) had an increase of 25 per cent or more. It seems probable that this group consists predominantly of the rather old, whose incomes do not change much, and the very young, whose incomes change rather rapidly. The next three income-groups are very similar to one another and to the average; but the last group (containing spending units whose 1949–50 income was £1,000 and over) exhibits certain peculiarities, the chief of which are a large mean change and a very large standard deviation. These are due to the occurrence of a number of rather large increases of income in this group.

From the analysis by occupation it seems that spending units with semi-skilled (machine) worker heads probably had a larger increase in income on the average than other spending units while those with unskilled heads had little or no increase. Those whose heads were managers and professional and technical employees had a considerable increase on the average; only 5 per cent suffered a fall in income and as many as 23 per cent had an increase of 25 per cent or more. The self-employed are remarkable for the smaller than average proportion who had an increase and the larger than average proportion with a decrease. Nevertheless their average change was positive. The great majority (72 per cent) of the retired and unoccupied had no sub-

TABLE X. *Distribution of change in income of spending units between 1949–50 and 1950–51, analysed by type of spending unit* (per cent of spending units of each type)

Characteristic of spending unit	*Increase of income*			*No substantial change (less than 5 per cent)*	*Decrease of income*			*Not ascertained*	*All spending units*		*Mean change in income*	*Standard deviation*
	25 per cent or more	*5 to 24 per cent*	*Total 5 per cent or more*		*Total 5 per cent or more*	*5 to 24 per cent*	*25 per cent more*		*Per cent*	*Number in sample*	*£*	*£*
All spending units	9	25	34	52	10	8	2	4	100	416	+20	92
Total income in 1949–50 :												
Under £200	22	15	37	61	1	1	—	1	100	69	+23	47
£200 to £399	8	30	38	46	12	7	5	4	100	149	+12	70
£400 to £599	4	24	28	56	11	8	3	5	100	105	+14	63
£600 to £999	1	35	36	47	15	15	—	1	100	46	+32	65
£1,000 and over	7	15	22	50	17	17	—	10	100	47	+89	409
Occupation of head of spending unit :												
Skilled worker	4	32	36	55	6	3	3	4	100	58	+12	41
Semi-skilled (machine occupation)	6	35	41	45	10	10	—	3	100	34	+35	55
Semi-skilled(other occupations) ...	14	28	42	50	7	7	—	1	100	52	+18	52
Unskilled	4	38	42	45	13	9	4	—	100	30	— 1	46
Clerical, shop assistants, etc. ...	8	32	40	40	16	15	1	4	100	46	+14	48
Managers, professional and technical employees	23	19	42	50	5	3	2	2	100	85	+88	254
Self-employed	7	11	18	43	25	20	5	14	100	35	+14	130
Retired, unoccupied and unemployed	3	7	10	72	11	5	6	6	100	76	—15	70
Industry of head of spending unit :												
Manufacturing, building and agriculture	6	35	40	48	9	7	1	3	100	138	+22	58
Services	12	23	36	49	12	9	2	3	100	195	+33	162
Not working	7	8	15	68	11	5	6	6	100	83	— 9	80
Age of head of spending unit :												
18 to 29	23	36	59	27	7	6	1	7	100	81	+46	82
30 to 39	7	30	38	48	10	10	—	4	100	83	+26	66
40 to 49	6	28	34	57	7	6	1	2	100	79	+18	62
50 to 59	9	21	29	56	13	9	4	2	100	68	+39	242
60 to 69	3	19	22	53	20	9	11	5	100	61	—13	77
70 and over	1	7	8	84	6	6	—	2	100	44	— 1	43
Sex of head of spending unit :												
Male	7	29	36	50	10	9	2	4	100	273	+28	130
Female	13	17	29	57	11	5	5	3	100	143	+ 5	69

stantial change in income; their average change, in marked contrast with other groups, was pretty certainly negative.

The analysis by industry adds little to the story but the analysis by age-group is again interesting. The average increase in income is greatest at the lowest age-group and declines as age advances, except in the 50 to 59 group where, as indicated by the exceptionally large standard deviation, there were some specially big changes. Spending units whose heads were aged 60 to 69 suffered the worst decreases: on the average their incomes fell by £13 and 11 per cent of these had decreases of 25 per cent or more. On the other hand, 84 per cent of spending units with heads aged 70 and over had little or no change in income.

THE MOBILITY OF INCOMES

If spending units are arranged in a table by 1949–50 income-groups in one direction and 1950–51 income-groups in the other we obtain an impression of the degree of mobility of the incomes of spending units from year to year. In Table XI the spending units are arranged by income-groups of £100 at a time up to the £700 level; thereafter the numbers are so small that broader groups have to be used. The table shows the percentage of spending units in each group in 1950–51 who had been in the same or other groups in the previous year. It will be seen that, with one exception, over 70 per cent—and frequently over 80 per cent—of spending units were in the same income-group from one year to the next. The exceptional case is the group who in 1950–51 had been between £600 and £699. Nearly half of these had moved up from lower income groups, in some cases from as low as the £300 to £399 group during the year. There is no obvious explanation of this phenomenon, and the number of units in the sample is so small that further analysis is not helpful.

TABLE XI

Distribution of spending units by their 1949–50 incomes within their 1950–51 income-groups
(per cent of spending units in each group)

1949–50 income-groups	*All spending units*	*1950–51 income-groups*									
		Under £100	*£100 to £199*	*£200 to £299*	*£300 to £399*	*£400 to £499*	*£500 to £599*	*£600 to £699*	*£700 to £999*	*£1000 to £1499*	*£1500 and over*
Under £100 ...	6	*82*	9	2	—	—	—	—	—	—	—
£100 to £199 ...	13	8	*84*	13	4	—	—	—	—	—	—
£200 to £299 ...	17	8	3	*75*	20	1	—	—	—	—	—
£300 to £399 ...	19	2	5	8	*72*	18	—	6	2	—	—
£400 to £499 ...	17	—	—	3	5	*74*	12	6	2	—	—
£500 to £599 ...	12	—	—	—	—	7	*80*	34	6	—	—
£600 to £699 ...	4	—	—	—	—	—	8	*39*	13	—	—
£700 to £999 ...	5	—	—	—	—	—	—	16	*72*	14	—
£1,000 to £1,499	4	—	—	—	—	—	—	—	4	*83*	8
£1,500 and over ...	3	—	—	—	—	—	—	—	—	3	*92*
All spending units	100	100	100	100	100	100	100	100	100	100	100
Sample (spending units interviewed)	416	19	47	70	69	72	35	28	30	25	21

The picture of income-mobility in Oxford given by Table XI contrasts rather sharply with the position in the United States.[1] In the table published in the August 1951 number of the *Federal Reserve Bulletin* U.S. spending units are arranged in income-groups of $1,000 at a time up to $5,000. These groups are clearly wider than our £100 intervals; yet the American survey shows that only in the lowest group do as many as 70 per cent stay in the same group from year to year. In the other groups only 40, 50 or 60 per cent of spending units belonged to the same income-group in 1950 as in 1949. Income-mobility seems to be considerably higher in the U.S. than in Oxford.

For international, or interregional, comparisons of income-mobility a convenient index would be the correlation coefficient between income of the last year and income of the year before. The Oxford coefficient for the years 1949–50 to 1950–51, calculated from ungrouped data is 0.98.

SOURCE OF INCOME

Finally, something can be said about sources of income. Table XII shows the distribution of spending units in each income-group by their principal source of income. Seventy-four per cent of all Oxford spending units derive most of their income from employment. The proportion in the middle income-groups (from £200 to £999) is over 80 per cent while employment is the principal source of income for only a third of spending units with less than £200 and less than half of those with £1,000 and over. A large proportion (43 per cent) of those with less than £200 derive most of their income from transfers (almost entirely government transfers); a quarter of those with £1,000 and over derive most of their income from rent, interest and dividends.

The distribution of income from particular sources can be shown for the various occupations, age-groups, and so on. Only employment income and government transfer income are received by a sufficient number of spending units to make a detailed analysis profitable. The analysis of employment income corresponds very closely with that shown earlier (Table III) for total income; average employment income is in each case a bit below average total income, particularly so in the older age-groups (60 and over). The distribution of government transfer income is presented in Table XIII.

Forty-four per cent of all spending units receive government transfers of one sort or another[2]; 26 per cent receive less than £50 and 19 per cent more. Of those with less than £200 a year half receive £50 or more. These are clearly the old age pensioners. In the other income-groups there are few who receive as much as £50 a year from this source but an important proportion receive something less than this. Within occupations it is noticeable that it is the spending units with unskilled heads and those whose heads are retired or unoccupied who have a considerable proportion receiving £50

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[1] As shown by the results of the Survey of Consumer Finances conducted by the Survey Research Center.

[2] Government transfers include National Insurance benefits, family allowances, old age and widows' pensions and war pensions.

TABLE XII

Principal source of income of spending unit by income-groups
(per cent of spending units)

Principal source of income	*All spending units*	*Under £200*	*£200 to £399*	*£400 to £599*	*£600 to £999*	*£1,000 and over*
Employment	74	35	82	85	84	46
Professional	1	—	—	1	3	13
Business	5	4	3	6	6	10
Rent, interest, dividends	6	8	4	5	3	26
Transfers	11	43	6	2	4	5
Other	4	10	5	—	1	—
All spending units ...	100	100	100	100	100	100
Sample (spending units interviewed)	416	66	139	107	58	46

TABLE XIII

Distribution of spending unit income from government transfers by type of spending unit

Characteristic of spending unit	*Income from government transfers*			*Total*	
	Nil	*£1 to £49*	*£50 and over*	*Per cent*	*Number in sample*
All spending units	56	26	19	100	416
Total income in 1950–51 :					
Under £200	40	10	50	100	66
£200 to £399	60	24	16	100	139
£400 to £599	61	30	9	100	107
£600 to £999	47	39	13	100	58
£1,000 and over	65	28	7	100	46
Occupational of head of spending unit:					
Skilled	62	29	9	100	58
Semi-skilled (machine)	45	51	4	100	34
Semi-skilled (other)	52	34	15	100	52
Unskilled	52	15	34	100	30
Clerical, shop assistants etc. ...	65	26	9	100	46
Managers professional and technical employees	72	23	5	100	85
Self-employed	59	25	16	100	35
Retired, unoccupied and unemployed	43	5	52	100	76
Age of head of spending unit :					
18 to 29	77	21	2	100	81
30 to 39	45	46	9	100	83
40 to 49	61	30	9	100	79
50 to 59	67	28	5	100	68
60 to 69	52	11	37	100	61
70 and over	25	2	73	100	44

or more from this source. A larger than average proportion of the spending units whose heads are semi-skilled (machine) workers receive up to £50 from this source; much of this is attributable to family allowances which are very frequently received in this group.[1]

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[1] Note that this group have high average size families. See Table IV.

The analysis by age-groups shows that only a small proportion (23 per cent) of spending units with heads aged 18 to 29 receive government transfers; but in the next age-group (30 to 39) there are 46 per cent receiving less than £50. This is the peak family size group. In the next two age-groups the proportion receiving government transfers declines; but it rises steeply after the age of 60, especially the proportion receiving £50 and over. These are clearly the old age pensioners again.

H. F. Lydall.

(*The next paper in this series will deal with liquid asset holdings.*)

APPENDIX

The Classification of Occupations

The classification of occupations presents unexpected difficulties. It is generally accepted that an occupational classification is something different from an industrial classification. Certainly some well-known occupations cut across industries (*e.g.* typist, painter, carpenter) but when one looks at a full list of occupations[1] one finds that the overwhelming majority are specific to particular industries. A coal-cutter can pursue his occupation only in the coalmining industry, a wool carder only in the woollen industry, and so on. Even the seemingly homogeneous occupations, such as carpenter, often mean very different things in different contexts. Hence any grouping of occupations that does cut across industries must inevitably be rather arbitrary.

For the purposes of this survey it was desirable to classify occupations into a few broad groups which would be economically significant. Some of these groups were relatively easy to define, *e.g.* ' unemployed ', ' retired or unoccupied ' and ' self-employed '. Then, amongst the employees, one can separate ' managers, and professional and technical employees ' and ' clerical workers, shop assistants and commercial travellers ' fairly satisfactorily. The few marginal cases, *e.g.* ' accountants ', have to be sorted out in the light of other information, such as salary.

The principal problem is how to deal with manual workers. In the official *Classification of Occupations* occupations are divided into the following ' Social Classes ' :

Class I	Professional, etc., occupations.
Class II	Intermediate occupations.
Class III	Skilled occupations.
Class IV	Partly skilled occupations.
Class V	Unskilled occupations.

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[1] *E.g. Classification of Occupations*, 1950, published by the General Register Office.

The allocation of each occupation to its appropriate ' social class ' is based on its ' general standing within the community.'[1] This criterion, however, scarcely seems to be the appropriate one for an economic analysis. On the one hand it tends towards a general upgrading of occupations; on the other it creates distinctions between occupations which seem to lack any objective basis. A postman, for example, goes into Class III (skilled); a caretaker into Class IV (partly skilled). A shop assistant of any description ranks as Class III (fully skilled), but a barman or barmaid rises no higher than Class IV (partly skilled).

The ' Social Class ' classification of the General Register Office proving unsuitable for our purpose, we decided to draw up a list of economic criteria for dividing manual workers into ' skilled ', ' semi-skilled ' and ' unskilled ' groups.[2] The criteria used are based primarily on the length of time required for training for the occupation, but a special additional semi-skilled group was established to include occupations in which it is not so much the period of training as the degree of responsibility or trustworthiness required that differentiates the occupation from purely unskilled work. The criteria adopted are listed below together with a few examples of the sorts of occupations falling within each group.

Skilled workers

Occupations which require a formal apprenticeship or recognised period of training lasting at least two years—or equivalent intensive informal training—without which the job cannot be undertaken.

Examples :

Fitter
Pattern maker
Refrigerator mechanic
Tool maker
Aircraft electrician
Photographer
Book binder
Bricklayer
Dressmaker
House decorator
Painter
Police constable.

Semi-skilled workers (machine occupations)

Occupations which require at least a fortnight's training or familiarisation before they can be undertaken.

Examples :

Motor car assembler
Coach finisher
Steel polisher
Welder
Machine setter (bakery)
Press operator
Trimmer
Paint shop worker.

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[1] Other attempts to classify occupations ' according to their social prestige ' are discussed by John Hall and D. Caradog Jones, ' Social Grading of Occupations ', *British Journal of Sociology*, Vol. 1, p. 31.

[2] I am indebted to Mr. K. G. J. C. Knowles and Mr. D. J. Robertson for constructing this classification.

Semi-skilled workers (other occupations)

Occupations which are not primarily machine occupations, but which require some training or familiarisation; also occupations which, though they may be undertaken virtually without training, nevertheless require responsibility (not supervisory responsibility) or other character qualifications.

Examples :

Storekeeper
Crane driver
Ambulance driver
Bus conductor
Caretaker
Furniture packer
Farm labourer
Housekeeper
Postman
Waitress

Unskilled workers

Occupations which can be undertaken without previous training, experience, special dexterity, or character qualifications.

Examples :

Labourer
Auctioneer's porter
Cleaner
Ward maid
Yard man
Domestic worker.

We would not claim that this classification is by any means perfect. The allocation of the various occupations to their appropriate groups still depends to some extent on personal judgement. But at least we have tried to establish objective criteria for the classification and on the whole they appear to work out reasonably.

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